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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,961	02/25/2002	Kenneth A. Peterson	SD-7122	5004

7590

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EXAMINER

THAI, LUAN C

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 02/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
10/082,961	PETERSON ET AL.	
Examiner	Art Unit	
Luan Thai	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-60 is/are pending in the application.
- 4a) Of the above claim(s) 27-33, 39, 40 and 42-60 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-20 is/are allowed.
- 6) ☒ Claim(s) 21-26, 34, 35 and 38 is/are rejected.
- 7) ☒ Claim(s) 36, 37 and 41 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-546) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

Applicant's election of Embodiment II of Fig. 16, claims 1, 3, 9, 12-16, 18-20, 21-38, and 40-41, in Paper No. 6 is acknowledged. However, claims 27-33 and 40 are not read on the elected Embodiment II of Fig. 16. In particular, claims 27-33 and 40 recite a second microelectronic device mounted back-to-back to the first microelectronic device and wire bonded to the second electrical conductor. Thus, claims 27-33 and 40 recite the limitations of the Embodiment I (figure 15C) and Embodiment III (figure 19) but the elected Embodiment II of Fig. 16, which discloses the first and the second microelectronic devices mounted on the first and the second sub-stacks with the active surface of the second device facing the backside of the first device, wherein the first and second devices are electrically flip-chip connected to the first and second electrical conductors on the first and the second sub-stacks, respectively. Therefore, claims 27-33 and 40 are withdrawn from consideration as being directed to a non-elected species.

Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Information Disclosure Statement

1. The information disclosure statement (IDS) filed on 02/25/02 has been considered by the examiner.

Oath/Declaration

2. The declaration filed 02/25/02 is acceptable.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 21-23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al (5,952,714) in view of Young et al (5,729,038 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 21-23 and 25, Sano et al disclose (see specifically figure 8 turning upside down) a package with a window for housing a microelectronic device comprising: a monolithic body 50, comprising a electrically insulating multilayered material (e.g., layer member 50a and layer member 50b, Col. 7, lines 36+ and Col. 8, lines 1-64); the body having a bottom surface, an opposing top surface, a stepped aperture disposed through the body, and two interior ledges; a first electrical conductor 54a disposed on the first ledge; a second electrical conductor 54c disposed on the second interior ledge; an integral window 56 made of transparent material (e.g., glass, Col. 8, lines 43+) disposed across the aperture and bonded to the body; a first microelectronic device 27 (e.g., a CCD chip) flip chip interconnected to the first electrical conductor 54a on

the first interior ledge with a light sensitive side facing the window, a second microelectronic device 43 (e.g., a CCD chip) flip chip interconnected to the second electrical conductor 54c on the second interior ledge, wherein a continuous ring seal 30 disposed in-between the first and second microelectronic devices and the body of the package. Sano et al do not explicitly teach that the window bonded to the body without having a separate layer of adhesive material disposed in-between the window and the body.

A window being bonded directly to a package body (e.g., encased joint geometry) is commonly applied in semiconductor art, specifically in optical device art, as disclosed by Young et al. In particular, Young et al (see specifically figures 4 and 6) disclose the window 420/620 bonded directly to the body 422 (e.g., encased joint geometry) without having a separate layer of adhesive material disposed in-between the window and the body.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the direct window bonding (e.g., encased joint geometry) in Sano's package, since such technique is commonly applied in the art, as disclosed by Young et al, and such application is held to be within the ordinary designing ability expected of a person skilled in the art for the purpose of improving the bonding strength between the window and the package body and avoid using of adhesive materials.

5. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al (5,952,714) and Young et al (5,729,038 of record), as applied to claim 21 above, and further in view of Glenn (5,867,368) (hereinafter called as "Glenn-368").

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 24, the proposed package of Sano et al and Young et al discloses all the limitations of the claimed invention as detailed above except for a polymer under-fill encapsulating the flip-chip electrical interconnections.

Using a polymer under-fill to cover the flip-chip connections, however, is commonly applied in the art, as taught by Glenn-368 (see polymer under fill 22 in figures 1 and 5, Col. 4, lines 56+), in order to improve the bonding strength of the flip-chip connections. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Glenn-368's teachings to the proposed package of Sano et al and Young et al in order to improve the bonding strength of the flip-chip electrical interconnections.

6. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al (5,952,714) and Young et al (5,729,038 of record), as applied to claim 25 above, and further in view of Glenn (6,117,193) (hereinafter called as "Glenn-193").

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 26, the proposed device package of Sano et al and Young et al discloses all the limitations of the claimed invention as detailed

above except for a dry inert gas (e.g., argon, nitrogen, or helium) being in-between the window and the ring seal comprising

A dry inert gas (e.g., argon, nitrogen, or helium, however) filling in-between the window and the ring seal is commonly applied in the art, specifically in optical packaging art, as taught by Glenn-193 (see figures 3-7, Col. 6, lines 45+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the proposed optical device package of Sano et al and Young et al by filling the cavity between the window 56 and the ring seal 30 with a dry inert gas (e.g., argon, nitrogen, or helium) since such application of the inert gas is common in the optical device package, and such modification is held to be within the ordinary designing ability expected of a person skilled in the art for the purpose of reducing the deflection of light being received by the optical device.

7. Claims 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al (5,952,714) and Young et al (5,729,038 of record), as applied to claim 21 above, and further in view of Nagano (5,357,056 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 34-35, the proposed device of Sano et al and Young et al discloses all the limitations of the claimed invention as detailed above except for a coverlid attached to the top surface of the body via a hermetic sealant.

Nagano while related to a similar optical device package design teaches (see specifically figures 2-11) that the optical device package comprises not only a window 1 disposed on the bottom side of the package but also a cover lid 13, as shown in figures 6-11 (or the cover lid 15 in figure 3, the cover lid 14 in figure 4), which is bonded to the top side of the package body via a hermetic sealing ring 12 (Col. 3, lines 40+) and contacts the backside of the microelectronic device 6, in order to improve the heat dissipating of the microelectronic device in package (Col. 3, lines 65+, Col. 4, lines 6+ and lines 16+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Nagano's teachings to the proposed device of Sano et al and Young et al, by using a lid covering the top side of the package and contacting the backside of the microelectronic device in order to improve the heat dissipating of the microelectronic device, and such application is held to be within the ordinary designing ability expected of a person skilled in the art.

8. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al (5,952,714), Young et al (5,729,038 of record) and Nagano (5,357,056 of record), as applied to claim 34 above, and further in view of Glenn (6,117,193) (hereinafter called as "Glenn-193").

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 38, the proposed device of Sano et al, Young et al, and Nagano discloses all the limitations of the claimed invention as detailed above

except for a dry inert gas (e.g., argon, nitrogen, or helium) being in-between the window and the ring seal comprising

A dry inert gas (e.g., argon, nitrogen, or helium, however) filling in-between the window and the ring seal is commonly applied in the art, specifically in optical packaging art, as taught by Glenn-193 (see figures 3-7, Col. 6, lines 45+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the proposed device of Sano et al, Young et al, and Nagano by filling the cavity between the window 56 and the ring seal 30 with a dry inert gas (e.g., argon, nitrogen, or helium) since such application of the inert gas is common in the optical device package, and such modification is held to be within the ordinary designing ability expected of a person skilled in the art for the purpose of reducing the deflection of light being received by the optical device.

Allowable Subject Matter

9. Claims 1-20 are allowed.
10. Claims 36-37 and 41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
11. The following is a statement of reasons for the indication of allowable subject matter. The prior art taken either singly or in combination fails to anticipate or fairly suggest:

- a) a third sub-stack comprising at least one layer of the electrically insulating multilayered material stacked on top of the second sub-tack, as recited by claim 1, especially when these limitations are considered within the specific combination claimed;
- b) the cover lid, which is attached on the top surface of the body for sealing the package, is transparent (as recited by claim 36), comprises a window (as recited by claim 37), especially when these limitations are considered within the specific combination claimed;
- c) a printed circuit board for the package mounting on, wherein the board comprises an opening through the board, the aperture in the package being aligned with the opening in the board, thereby allowing light to pass through both the opening and the aperture to interact with the light-sensitive side of the first microelectronic device, as recited by claim 41; especially when these limitations are considered within the specific combination claimed.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is (703) 308-1211. The examiner can normally be reached on 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Luan Thai
January 20, 2003



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